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the spring flowers come, when each student is prepared to make an herbarium of plants collected and determined by himself. It is doubtless true that the work in the fall term helps in the field work herein mentioned, but there is no question that students with no knowledge of plants can take hold of botany in the winter and do excellent, interesting work—work that is at the foundation of morphology and gross anatomy, the fresh material for which is in better condition than during the growing season when buds are forming and branches and leaves obscure the view.—*Byron D. Halsted.*

ENTOMOLOGY.

A CARNIVOROUS BUTTERFLY LARVA—PLANT-LICE FEEDING HABIT OF FENESICA TARQUINIUS.[1]—One of the most interesting of our butterflies is that known as *Fenesica tarquinius*, a unique Lycænid having the wings above brown-black in color with conspicuous orange markings both on primaries and secondaries. It has a wide geographical range, occurring very generally over North America as also in Asia.

Donovan, in his "Insects of India" (Pl. XLIV, fig. 1), illustrates the butterfly rather poorly, but says nothing about the larva.

Boisduval and LeConte (Hist. des Lép. et des Chen. de l'Am. Sept., p. 128, Pl. XXXVII) figure the larva, pupa and imago under the name of *Polyommatus cratægi*, and simply quote Abbot as stating that the larva lives on several species of Cratægus.

Scudder (Proc. Essex Inst., Vol. III, p. 163, 1862) treats of it under the name of *Polyommatus porsenna* (Syn. List of Am. Rurales, Bull. Buff. Soc. Nat. Hist., III, p. 129, May, 1876) and gives the food-plants of the larva as Alnus, Ribesia, Vaccinium and Viburnum. Later, in the AMERICAN NATURALIST for August, 1869, he gives the food-plants as follows: "Probably arrow-wood, elder and hawthorn."

Grote (Trans. Am. Ent. Soc., II, p. 307) first proposed the generic name of Fenesica, but says nothing about its larval history.

Strecker (Butt. and Moths, etc., Diurnes, p. 103) repeats simply from Scudder; while Wm. H. Edwards, in his admirable life-histories of butterflies, has not so far treated of this particular species. In short, so far as the published records go, it has been generally assumed that the larva feeds upon the plants named.

The object of this brief communication is to show that in this larva we have one that is truly carnivorous, a fact which is extremely interesting because, so far as I can find, there is not another recorded carnivorous butterfly larva; and Mr. Scudder, who has given great attention to the butterflies, writes me in a recent letter, in reply to an inquiry on this point, that he cannot recall any mention of such. Quite a number of Heterocerous larvæ are known to be carnivorous by exception, and not a few are so as a rule. These are chiefly found among Pyralids, and it is not necessary for my present purpose to refer to the cases in detail.

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[1] Abstract of a paper by C. V. Riley, read Feb. 20, 1886, before the Biological Society of Washington.

For some years now I have been studying the remarkable life-habits of the Aphididæ and especially of some of the gall-making and leaf-curling species of Pemphiginæ.

In the collecting of material and making of observations, I have been assisted by Mr. Th. Pergande, who has on a number of occasions, since 1880, found the larva of this Fenesica associated with various plant-lice. Among the species with which it has been thus found associated are *Pemphigus fraxinifolii* Riley, which curls the leaves of Fraxinus; *Schizoneura tessellata* Fitch, which crowds upon the branches of Alnus; and *Pemphigus imbricator* Fitch, which congregates in large masses on Fagus. All these species produce much flocculent and saccharine matter.

The frequency with which this larva was found among these plant-lice justified the suspicion that it feeds upon them or derives benefit from them; yet up to 1885 the presumption was that it benefited from the secretions of the plant-lice rather than from the insects themselves. Last fall, however, Mr. Pergande obtained abundant evidence that the Fenesica larva actually feeds upon the Aphidids, and I thought it worth while to call attention to this positive proof of the carnivorous habits of the species. That the different species of plant-lice are the normal food of this larva is rendered more than probable for the following reasons:

1. Attempts to feed the larva upon the leaves upon which it was found have proved futile, the larva perishing rather than feed upon them.

2. The food-plants given by the authorities are such as are well known to harbor plant-lice.

3. Mr. Scudder's authorities, as he informs me, were picked up here and there and one of them for alder, which he recalls, viz., a Mr. Emery "found it more commonly on a limb among plant-lice."

4. Mr. Otto Lugger has frequently observed the larva around Baltimore, among *Pemphigus imbricator* on beech, but never dis-associated from the lice, and Judge Lawrence Johnson also found it in connection with the same species around Shreveport, La., last fall and surmised that it might feed upon the Pemphigus, but neither of these observers were able to get positive proof of the fact.—*C. V. Riley*.

WITLACZIL ON COCCIDÆ.—Dr. E. Witlaczil completes his notes on the plant-lice by an interesting article on the Morphology and anatomy of the Coccidæ, in *Zeitschr. f. Wissen. Zoologie*, Vol. XLIII, pp. 149–174. At first both the male and the female larvæ possess limbs, antennæ and simple eyes, which are subsequently lost by both sexes, the females degenerating so as to become wax-covered, immovable forms, and the males acquiring an improved edition of all these organs, with wings superadded. The antennæ and wings of the males arise as evaginations from invaginal disks, are afterwards withdrawn during the quiescent or pupal stage, to be finally driven out again on reaching maturity. Contrary to the usual way in Hemiptera, these males undergo complete metamorphosis. The waxy coat of the female consists not of the larval cuticles that were shed, but of variously crumpled and felted wax filaments emitted by dermal glands, and enclosing the remains of the cuticles. The embryological development is much as in Aphides, but the eggs have no pseudo-vitellus.

Some notes on the Chermetidæ are appended to the article, especially on *Chermes abietis* and on Phylloxera. He kept the galls of Chermes, in autumn, till the parthenogenetic females escaped, of two varieties, some yellow, others nearly black. The female oviposited on the needles of a pine-branch in a heap. After this operation the mother died, protecting the eggs with her shrunk body and wings. In spring large wingless females were found on the pine-shoots, having remained over winter. Each had thirty to forty egg tubules, with two to four well-formed eggs; and the eggs had a pseudo-vitellus. The eggs were laid in masses at the base of the young pine-shoots; the masses of eggs being covered with wax and with the carcass of the mother. The young issuing from these eggs moved to the axils of the needles, and together formed the nucleus of a cone-like gall; by their sucking the needle swells, coalescing with the gall. It is not the swelling of the needle, but of the branch that causes the gall; and this is due to the piercing action of the larvæ, not of the mother.—*G. Macloskie.*

THE ORIGIN OF THE SPIRAL THREAD IN TRACHEÆ.—A CORRECTION.—Since the article on this subject was published in the May NATURALIST, I have examined more specimens of insect tracheæ, in which the "spiral thread" seems to be present; but I do not think the tænidia invariably form a continuous spiral thread. In the axils of the branches we see short spindle-shaped tænidia; and each branch has a separate "spiral thread." In certain fine tracheæ of the eyes of the fly no spiral threads are developed, judging by Hickson's researches. Where the thread is continuous it may be called a *tænidium;* when only separate rings are developed they may be called *tænidia.* I think, however, that I have demonstrated the nuclear origin of the "spiral thread," and that the elongated filamental nuclei of the endotrachea coalesce to form the spiral *tænidium.*—*A. S. Packard.*

DESTRUCTIVE LOCUSTS IN TEXAS.—During the past winter the eggs of some species of locusts were reported by Mr. R. T. Flewellen, of Houston, Texas, to occur in great numbers in Washington county, and fears were expressed of great injury, this season, from the resulting locusts. Professor Riley, of the Department of Agriculture, has had the matter investigated and it appears that the young locusts, which are now all hatched, turn out to be one of the larger wide-spread species, viz., the differential locust (*Caloptenus differentialis*). This species has at times been very abundant in Illinois and in other States but, according to its past history, there is no danger of its ever becoming so serious a pest as the Rocky Mountain locust, and hence Professor Riley believes there is no occasion for alarm.

ENTOMOLOGICAL NEWS.—At a recent meeting of the London Entomological Society, the venerable Professor Westwood remarked that an insect (*Machærota ensifera* Burm.) in Ceylon, allied to the frog-hopper (Aphrophora), instead of being enclosed in a liquid (cuckoo-spittle), formed a case by the rapid hardening of the liquid secreted.——Dr. Geo. Marx, artist of the Agricultural Department, publishes in *Entomologia Americana* for May, a description of the male of *Gasteracantha rufospinosa* from Florida, with excellent figures of the two sexes. Although 170 species of this genius are known, the males of only two species have been hitherto discovered. The male differs much in shape, besides being less than one-quarter as large as the female.——In Bulletin No. 5 of the Cal. Acad. Sciences, T. L. Casey revises the California species of Lithocharis and allied genera of Staphylinidæ.——The Transactions of the American Entomological Society, XII, Nos. 3, 4, complete an excellent volume. They contain a thorough monograph of North American Chrysididæ, by S. Frank Aaron, illustrated by five plates; a monograph of the earlier stages of the Odonata, subfamilies Gomphina and Cordulegastrina, by Dr. H. A. Hagen; and a useful bibliographical and synonymical catalogue of the North American Cynipidæ, by Mr. W. H. Ashmead, with description of new species. Appended is a list of species peculiar to designated trees and plants, the greater number, as is well known, living on the oaks.

ZOOLOGY.

SELF-DIVISION IN SEPTIC MONADS.—In Dr. Dallinger's annual address before the Royal Microscopical Society, Feb. 10, he detailed the results, which are published in full in the journal of the society for April. Four forms were selected for study. In each of the four organisms the facts were discoverable in the development of the nucleus, the origin of the flagella and the growth of the body. They were best seen in *Tetramitus rostratus* and *Polytoma uvella;* not quite so well in *Dallingeria drysdali*, and least perfectly in *Heteromita rostrata;* but in all they were seen with sufficient clearness to leave no doubt. Each of these septic organisms terminates a long series of fissions with what is practically a generative act of fusion. The last two of a long chain of self-divided forms fuse into one, become quite still, and at length